

THE TEACHER-LEVEL FACTORS

Now we turn our attention to those factors that affect individual students in the classroom—the independent impact that a teacher can have on student achievement. Naturally, an individual teacher is influenced by decisions the school makes (decisions that include a guaranteed and viable curriculum, challenging goals, and feedback). However, the teacher-level factors addressed here are primarily a function of decisions made by individual teachers, including instructional strategies, classroom management, and classroom curriculum design.

Before the mid-1980s, studies of effective schooling tended to look at school-level factors only, that is, the school as having a unitary and consistent impact on student achievement. Good and Brophy (1986) warned of the consequences of this perspective:

Studies of large samples of schools yield important profiles of more and less successful schools, but these are *group averages* [original emphasis] that may or may not

describe how a single effective teacher actually behaves in a particular effective school. Persons who use research to guide practice sometimes expect all teachers' behavior to reflect the group average. Such simplistic thinking is apt to lead the literature to be too broadly and inappropriately applied. (p. 588)

A useful question, then, for anyone wishing to understand those factors that enhance student achievement is this: What influence does an individual teacher have apart from what the school does?

The Effect of Individual Teachers

Although most attempts to answer this question arrive at slightly different quantitative estimates, all researchers agree that the impact of decisions made by individual teachers is far greater than the impact of decisions made at the school level. Reporting on their analysis of achievement scores from

five subject areas (mathematics, reading, language arts, social studies, and science) for some 60,000 students across grades 3 through 5, S. Paul Wright, Sandra Horn, and William Sanders (1997) note

The results of this study will document that the most important factor affecting student learning is the teacher. In addition, the results show wide variation in effectiveness among teachers. The immediate and clear implication of this finding is that seemingly more can be done to improve education by improving the effectiveness of teachers than by any other single factor. *Effective teachers appear to be effective with students of all achievement levels regardless of the levels of heterogeneity in their classes [emphasis in original].* If the teacher is ineffective, students under that teacher's tutelage will achieve inadequate progress academically, regardless of how similar or different they are regarding their academic achievement. (p. 63)

This study and others conducted by William Sanders and his colleagues (Sanders & Horn, 1994; Wright, Horn, & Sanders, 1997) rather dramatically illustrate the profound impact an individual teacher can have on student achievement. For example, Kati Haycock (1998) notes that Sanders' results are most revealing in determining the achievement differences between students who spend a year with a highly effective teacher as opposed to a less effective teacher. This difference is depicted in Figure 8.1. On the average, the most effective teachers produced gains of about 53 percentage points in student achievement over one year, whereas the least effective teachers produced achievement gains of about 14 percentage points over one year. To understand these results, consider the fact that researchers estimate that students typically gain about 34 percentile points in achievement during one academic year (see

FIGURE 8.1

Student Achievement Differences Affected by Teachers

Teacher	Student achievement gain in 1 year
Least effective	14 percentage points
Most effective	53 percentage points

Note: Sanders identified "most effective" versus "least effective" teachers by ranking them in terms of gains in student achievement and then organizing that rank order into five categories or quintiles. "Most effective" teachers were defined as those in the highest category (quintile 1); "least effective" teachers were defined as those in the lowest category (quintile 5).

For a technical discussion, see Haycock, 1998.

Adapted from

Sanders, W. L., & Horn, S. P. (1994). The Tennessee value-added assessment system (TVAAS): Mixed-model methodology in educational assessment. *Journal of Personnel Evaluation in Education*, 8, 299-311.

Wright, S. P., Horn, S. P., & Sanders, W. L. (1997). Teacher and classroom context effects on student achievement: Implications for teacher evaluation. *Journal of Personnel Evaluation in Education*, 11, 57-67.

Glass, McGaw, & Smith, 1981). That is, a student who scores at the 50th percentile in mathematics in September will score at the 84th percentile on the same test given in May. The findings reported in Figure 8.1 indicate that over a year, students in classes of the most effective teachers will gain much more in achievement than is expected (i.e., 53 percentile points as opposed to 34 percentile points). However, students in the classes of the least effective teachers will gain much less in achievement than is expected (i.e., 14 percentile points as opposed to 34). These findings are even more startling when we consider that some researchers have estimated that students gain about 6 percentage points simply from growing one year older and gleaning new knowledge and information through everyday life (Hattie, 1992; Cahen & Davis, 1977). From this perspective, we might say the least effective teachers add little to students' knowledge over what would be expected from one year of maturation.

If the effect of attending the class of one of the least effective teachers for a year is not debilitating enough, the cumulative effect can be devastating. To illustrate, consider Figure 8.2, which is again based on data from the work of Sanders and his colleagues (as reported by Haycock, 1998).

Figure 8.2 shows a 54-percentile point discrepancy in achievement gains between students with least effective teachers versus those with most effective teachers—29 percentage points versus 83 percentage points respectively over three years. Commenting on this discrepancy, Haycock (1998) notes

Differences of this magnitude—50 percentile points—are stunning. As all of us know only too well, they can represent the differences between a "remedial" label and placement in the "accelerated" or even "gifted" track. And the difference between entry into a selective college and a lifetime at McDonald's. (p. 4)

Sanders and his colleagues gathered their data from elementary students in Tennessee, yet they are not the only ones to find these differences in achievement. Haycock (1998) reports similar findings from studies conducted in Dallas and Boston.

I have taken a slightly different approach and come to the same conclusions. The studies conducted in Tennessee, Dallas, and Boston were based on data acquired from students over time; I started my calculations with the assumption gathered from my review of research—that schooling accounts for about 20 percent of the variance in student achievement (see the discussion in

FIGURE 8.2

**Cumulative Effects Over Three Years Between Students
with Least Effective Versus Most Effective Teachers**

Most effective teacher	83 percentile point gain
Least effective teacher	29 percentile point gain

Chapter 1). However, in my synthesis of the research, I also found that about 67 percent of this effect is due to the effect of individual teachers. That is, about 13 percent of the variance in student achievement in a given subject area is due to what the teacher does and about 7 percent is due to what the school does (Bosker, 1992; Luyten, 1994; Madaus et al., 1979; Marzano, 2000a; Stringfield & Teddlie, 1989). The implications of my analysis are reported in Figure 8.3. For a detailed discussion of how Figure 8.3 was derived, see Technical Note 6, pp. 191–192.

The six scenarios in Figure 8.3 show effects on student achievement of various combinations of school and teacher effectiveness under the assumption that the student enters school achieving at the 50th percentile. If a student begins at the 50th per-

centile in mathematics, for example, and attends an average school and has an average teacher, her achievement will still be at the 50th percentile at the end of about two years (as depicted in the first scenario in Figure 8.3). Now let's consider the second scenario where this student attends a school that is one of the least effective and has a teacher that is classified as one of the least effective. After two years the student has dropped from the 50th percentile to the 3rd percentile. In the third scenario, the student is in a school classified as one of the most effective but has a teacher classified as one of the least effective. Although she enters the class at the 50th percentile, she leaves it two years later at the 37th percentile. In the fourth scenario, the student is in a school that is considered one of the least effective, but she is with

FIGURE 8.3

Effects on Student Achievement of School and Teacher Effectiveness with Student Entering School at the 50th Percentile

School and Teacher Scenario	Achievement Percentile After Two Years
Average School and Average Teacher	50th
Least Effective School and Least Effective Teacher	3rd
Most Effective School and Least Effective Teacher	37th
Least Effective School and Most Effective Teacher	63rd
Most Effective School and Most Effective Teacher	96th
Most Effective School and Average Teacher	78th

See Technical Note 6, pp. 191–192, to determine how average, least effective, and most effective schools and teachers were defined.

Adapted from Marzano, R. J. (2000a). *A new era of school reform: Going where the research takes us*. Aurora, CO: Mid-continent Research for Education and Learning (ERIC Document Reproduction Service No. ED 454255)

a teacher classified as one of the most effective. The student now leaves the class at the 63rd percentile—13 percentile points higher than she entered. The fifth scenario is the most optimistic of all. The student is not only in a school classified as one of the most effective but is with a teacher classified as one of the most effective. She enters the class at the 50th percentile but leaves at the 96th percentile. In the sixth scenario, the student is in a school that is one of the most effective and is with a teacher considered average. After two years the student has risen from the 50th percentile to the 78th percentile.

Regardless of the research basis, it is clear that effective teachers have a profound influence on student achievement and ineffective teachers do not. In fact, ineffective teachers might actually impede the learning of their students. What then are the characteristics of an effective teacher?

Characteristics of an Effective Teacher

I have concluded that the nearly 3,000,000 teachers in this country (National Center for Educational Statistics, 2002) are probably distributed normally in terms of their effectiveness as defined in terms of their impact on student achievement. Consistent with characteristics of the normal or bell curve, most of the teachers are in the middle of the effectiveness distribution or not too far away from the average. There are a few at the extreme positive end and a few at the extreme negative end. This means that most teachers are a little below or a little above average in terms of their impact on student achievement. I

would put teachers at the extreme positive end in the most effective category and teachers at the extreme negative end in the least effective category. A teacher who masters the three factors I have identified would not necessarily be reassigned to the most effective category. Rather, I believe that mastery of the three teacher-level factors will certainly render a teacher at least average (and probably well above average). Yet, teachers who are average in terms of their effectiveness can still have a powerful impact on student achievement as illustrated in the sixth scenario in Figure 8.3.

Specifically, this scenario illustrates that if teachers exhibit average performance and a school is willing to do all that it can to be most effective, then students in that school will demonstrate remarkable gains. Many principals have reported to me that they don't have the freedom or resources to hire the most experienced or most talented teachers. This discussion indicates that such talent and experience are not a prerequisite to effectiveness. If a school is willing to do all that it can at the school level and if all teachers in the school are at least competent in their profession, the school can have a tremendous impact on student achievement.

Teacher-Level Factors: A Comparison Across Researchers

My three teacher-level factors are not the only ways to organize the research on teacher effectiveness. In fact, researchers have identified many variables that correlate with teacher effectiveness. Kathleen Cotton

(1995) has identified more than 150 variables that are components of teacher effectiveness; Barry Fraser and his colleagues (Fraser, Walberg, Welch, & Hattie, 1987) list some 30 variables. These long lists of variables have been organized in a variety of ways. For example, Jere Brophy (1996) uses the following categories:

- instruction,
- classroom management,
- disciplinary interactions, and
- student socialization.

Bert Creemers (1994) uses three categories: curriculum, grouping procedures, and teacher behaviors. Finally, Cotton (1995) uses the following categories to organize the 150 variables she has identified:

- planning,
- setting goals,

- classroom management and organization,
- instruction,
- teacher-student interactions,
- equity, and
- assessment.

As was the case with the school-level factors, my three teacher-level factors are, in most cases, simply a reorganization of the work of other researchers. See Figure 8.4 for a more explicit explanation.

To derive my three factors, I have collapsed two or more categories from another researcher into a single category or placed elements of another researcher's single category into two of my categories. For example, I collapsed three of Cotton's categories into the single category of "classroom management" because Cotton's description of these elements is nearly synonymous with my description of classroom management. For

FIGURE 8.4

Comparing Teacher-Level Factors Across Researchers

Marzano (2000a)	Brophy (1996)	Creemers (1994)	Cotton (1995)
Instructional strategies	Instruction	Grouping procedures/teacher behaviors	Planning Setting goals Instruction
Classroom management	Classroom management Disciplinary interventions Student socialization	Teacher behavior	Classroom management and organization Teacher-student interactions Equity
Classroom curriculum design		Curriculum	Assessment

similar reasons, I placed Creemer's category of "teacher behaviors" into my categories "instructional strategies" and "classroom management."

The following three chapters address each of the three teacher-level factors. Chapter 9 explores instructional strategies, Chapter 10 explores classroom management, and Chapter 11 explores classroom curriculum design.

Despite discussing the teacher-level factors in isolation, they are not practiced in isolation. In fact, studies that have attempted to identify the unique or independent effects of instruction versus management versus classroom curricular design have not met with much success (Levy, Wubbels, Brekelmans, & Morganfield, 1997). The act of teaching is a holistic endeavor. Effective teachers employ effective instructional strategies, classroom management techniques, and classroom curricular design in a fluent, seamless fashion. A variety of researchers support this conclusion (Leinhardt & Greens, 1986; Brooks & Hawke, 1985). In his article "In Pursuit of the Expert

Pedagogue," David Berliner (1986) likens an expert teacher to a chess master, capable of seeing many things simultaneously and making judgments with seeming ease and fluency.

The interdependence of the three teacher-level factors underscores their difference from the five school-level factors. The school-level factors are ranked in the order of their impact on student achievement, but the teacher-level factors are not. Although there might be research available or in process that allows for this delineation, I have not yet found it.

Summary

This chapter introduces the three teacher-level factors: instructional strategies, classroom management, and classroom curriculum design. Although discussed separately, they cannot be isolated in terms of their classroom application or their impact on student achievement. Additionally, the impact of the individual classroom teacher could have a greater impact on student achievement than the five school-level factors.